



PROTECTING THE CELLULAR NETWORK HOW CAN WE MAKE THIS WORK?

Grounding Methodologies & Connections; Writing Effective Grounding Standards and Job Specifications.



The Six Phases of a Project

- 1. Enthusiasm**
- 2. Disillusionment**
- 3. Panic**
- 4. Search for the Guilty (find the electrician)**
- 5. Punishment of the Innocent**
- 6. Praise and Honor for the Non-Participants**



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■ **Grounding Methodologies and Connections:** Obtaining the best bang for the buck by ensuring proper design and implementation through the use of well written Grounding Standards and Job Specifications.

■ **Description:**

How to ensure your General Contractor understands, and implements correctly, your grounding requirements when your site is being constructed and built.

The emphasis is power, interior & exterior grounding and workmanship methodologies. This session will share our learning's and experience in grounding and protection of MSC, Cell and Remote Site facilities.



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■ Description (continued):

Herein we offer some examples of what many construction crews and contractors will do, and get away with if the customer is not extra vigilant every step of the way, and even times when the customer is vigilant. Toward that end, we discuss the importance of writing an effective Scope of Work and Work Specification to help overcome any confusion the contractor may have in completing the required work.

Secondly, we'll take a look at Telco grounding standards documentation used by Telco's to govern their work processes. What is effective and what is ineffective?



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■ Description (continued):

Telco company standards have been written a certain way for decades, but are they really of benefit to the project managers, engineers, contractors and other users? Or are they basically a written forum for one or two experts to provide technical knowledge, but without providing useable strategies and specific steps to accomplish the field work?

This talk will offer ideas and methods on how to build and write an effective Technical Standard that is truly beneficial to your company, the engineers, technicians and contractors who must understand and follow the requirements in the document(s).



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Electrical Protection of the Cellular Network: What are the basic objectives?

- **Protect people working in and around the facility**
- **Protect the facility from electrical disturbances -- prevent and minimize any damage**
- **Protect the equipment and communications service – keep the site on the air (avoid service outages)**
- **Legal Compliance (NFPA70, NFPA70E)**
- **Successfully and cost effectively implement and maintain the “protection”**



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Who are the main players involved?

Sometimes the implementation engineer has both roles

- Telecom Real Estate Group (finds & acquires the property)
- Telecom Construction – Implementation Engineer (write and engineer the project)
- Telecom Project Manager or Owner's Representative (oversees project and may be located onsite throughout job)
- General Contractor/Tower Company (Contracted by the Telco to design and build the site)
- Materials Supplier (supplies the required standard products and materials for the job)



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What is the typical process and how is this accomplished today?

- A major contractor is awarded “THEE project”.
- RFP’s go out over an open bid
- Contractor is awarded work directly



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What are some of the pitfalls that keeps the carrier from obtaining exactly what is required?

- **Lack of Customer Oversight and Vigilance?**
- **A major contractor is awarded “THEE project”.**
 - They do not have in-house resources to accomplish the work.
 - They hire a larger sub-contractor
 - That sub hires more contractors
 - Those contractors have never worked on telecommunication sites
- **A bid goes out for a specific project**
 - Many times information is limited
 - Scope of Work is sparse and very inadequate for bid process



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Contractor 's View Point:

What critical things must you ensure the General Contractor understands?

- The contractor must become your ally. It is an investment of time and money, but the ROI will pay dividends to both parties.
- In todays economy price is important, but you get what you pay for. If you only drive for low bid, then that is exactly what you will get.
- What protects us from being just another name on a list of contractors? We never get any work because you have your "buddies" that you award all the work to. How do we convince you that we can deliver?
- The contractor must take the time (unpaid) to read and understand all aspects of our work.

What programs are available for contractors to study? Why should we read your stupid requirements that neither of us understand? What is in it for us to spend our time reading your standards only to discover you let the next guy get away with sloppy work?



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Contractor Viewpoint (con'd) :

- Contractor & Customer must know how their work is going to affect the whole operation.
- Customer must understand the realistic project timeline. They must look at the whole project, visualize how what they are installing will affect future projects and expansion.
- Contractor must have the freedom to communicate when there are problems, and know you will take the time to listen. Contractor must better understand your role in the company and what your limitations are in the decision making process. Who can we call when you are not available?
- Both Contractor and Customer must understand the workmanship requirements. Common installation methods accepted in other industries are not necessarily acceptable practices in telecommunications. They should provide pictures of their work methods. NOTE: The carrier should provide training courses that identify acceptable/non-acceptable methods.



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SOME TYPICAL WORK EXAMPLES:



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New Cell Site in Mountains, Montana. Buried Ground System was correctly designed and installed by contractor, however frozen earth yielded invalid readings. Returned in summer and measured high resistance. Soil Resistivity very high.





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Down lead measured high resistance....
inspection verified the buried ring was "open"



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Perfectly straight low impedance wire path (NOT!!);
If I could just figure out which of these is the ring??



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18" Ground Rod: Is this due to corrosion or was it installed this way?



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Buried Split Bolt Connection: Guaranteed to last!



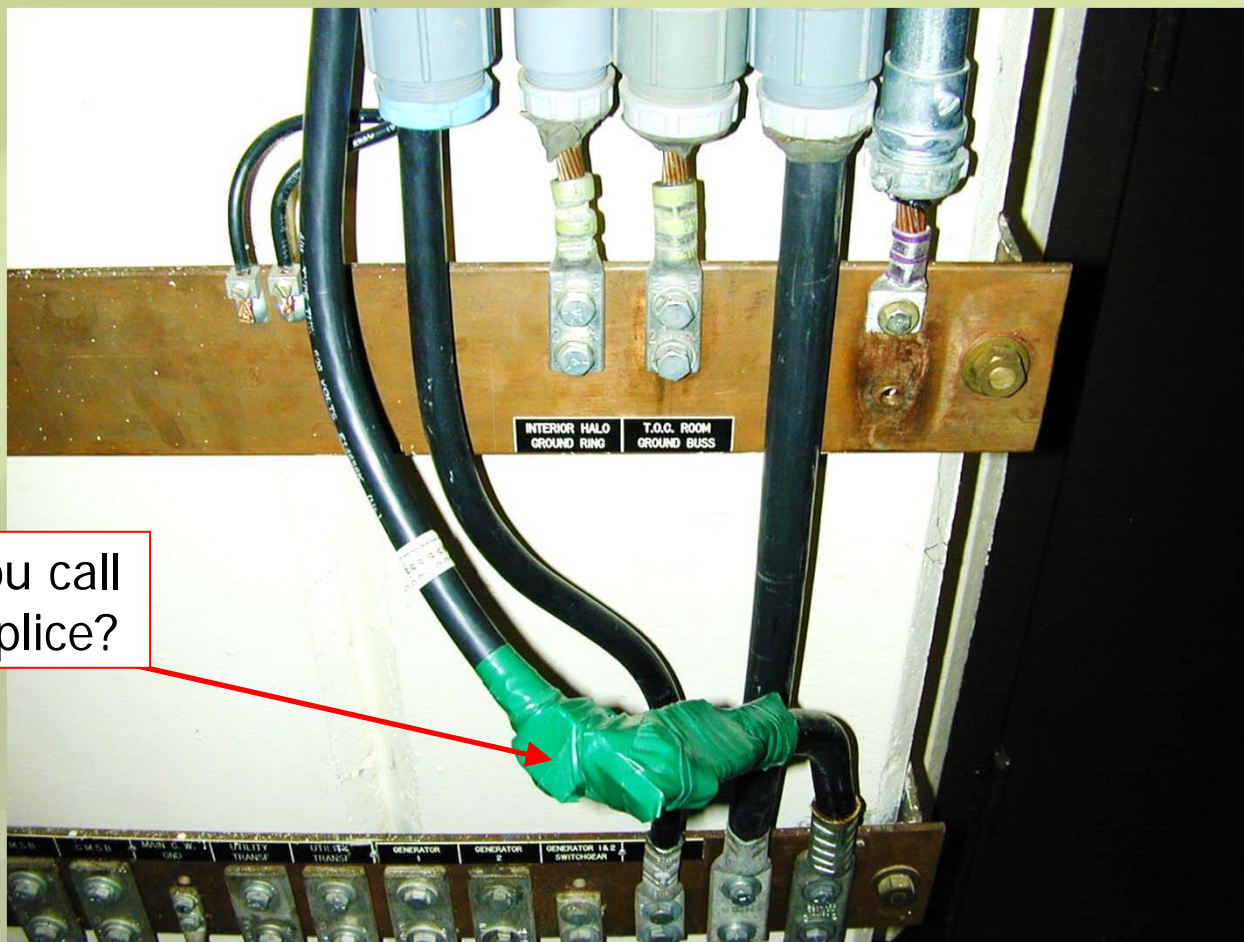
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Top Quality Craftsmanship!

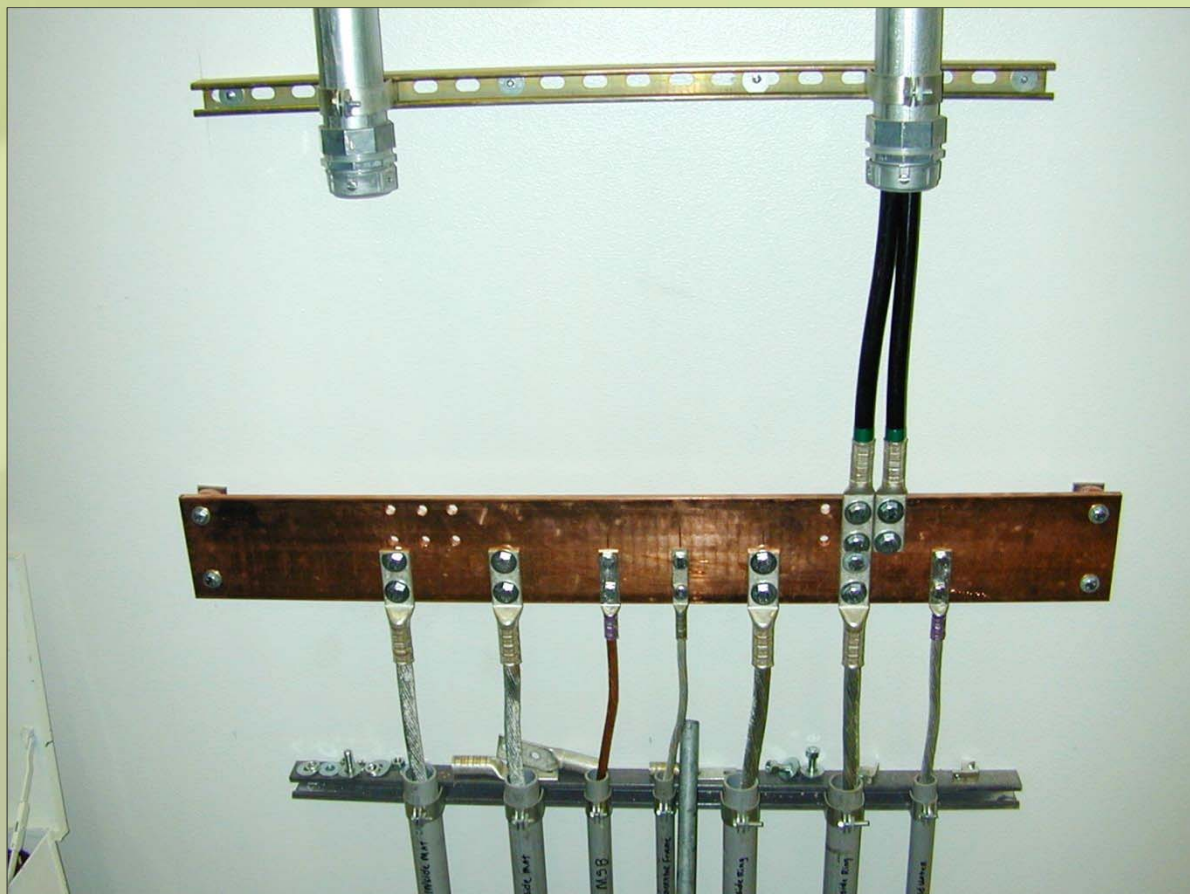


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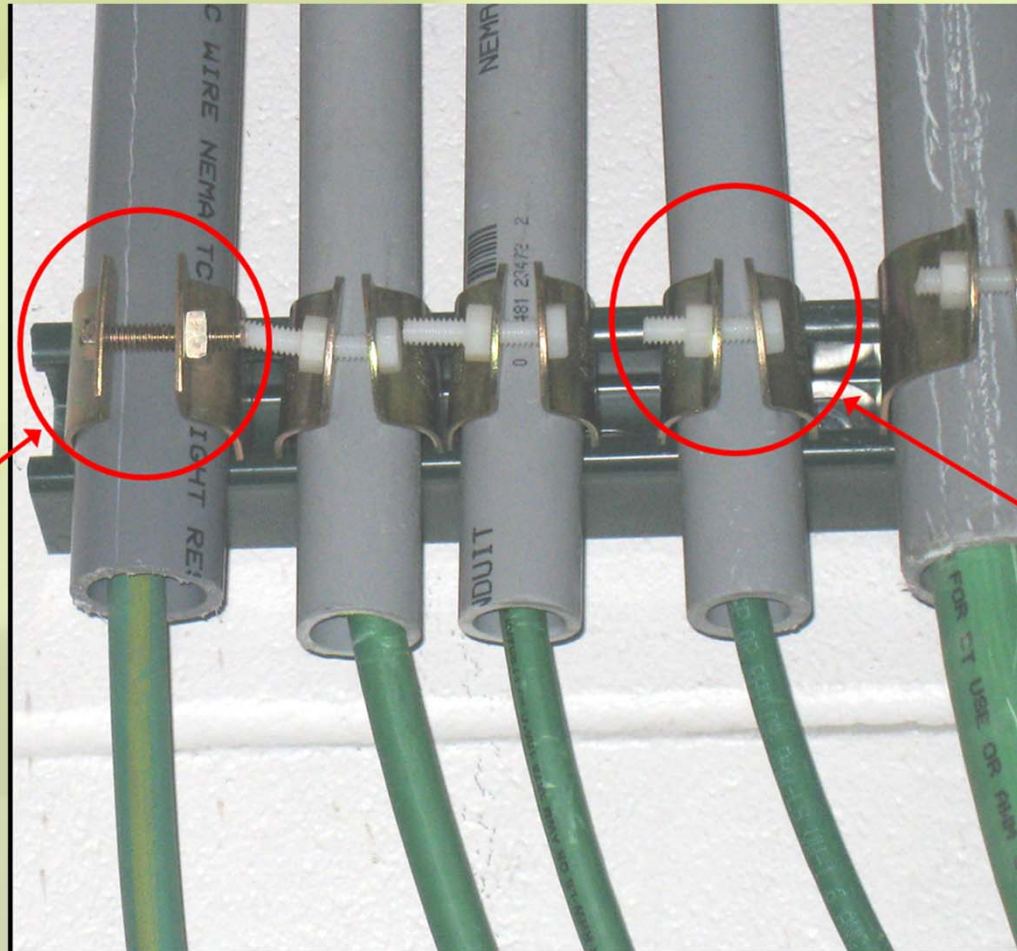
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Help Me I'm Choking! I've Self Induced!



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**Metallic
Strut, Clamp,
Bolt
(CHOKE)**

**Plastic Bolt
Breaks
Electrical
Continuity
(NO
CHOKE)**



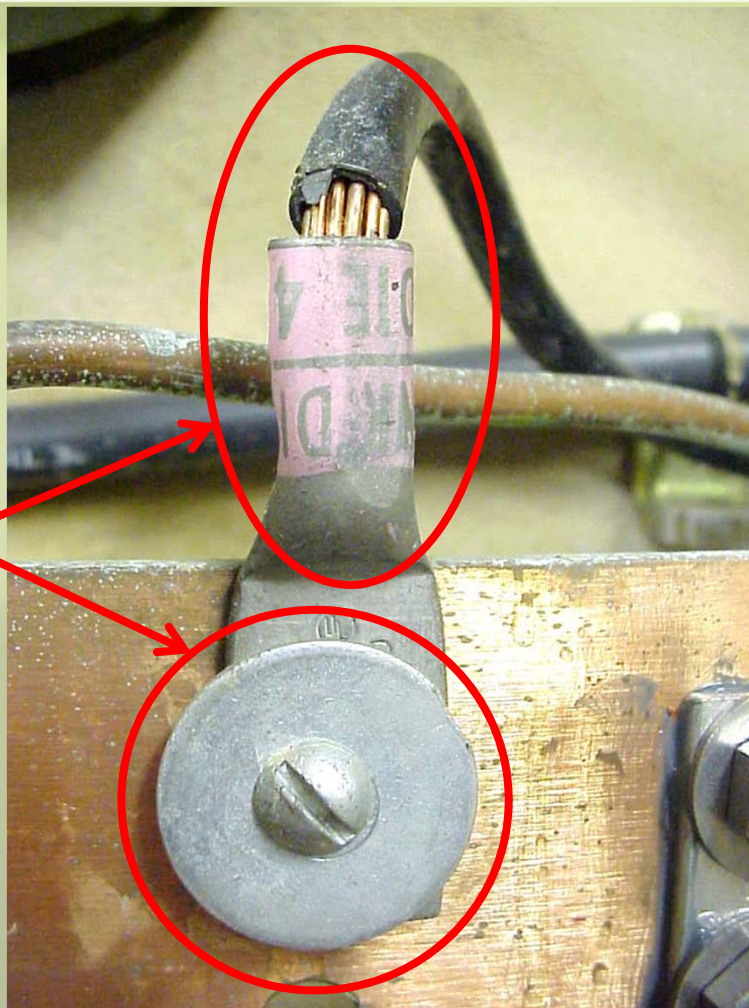
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Low Impedance Wire Routing!!!



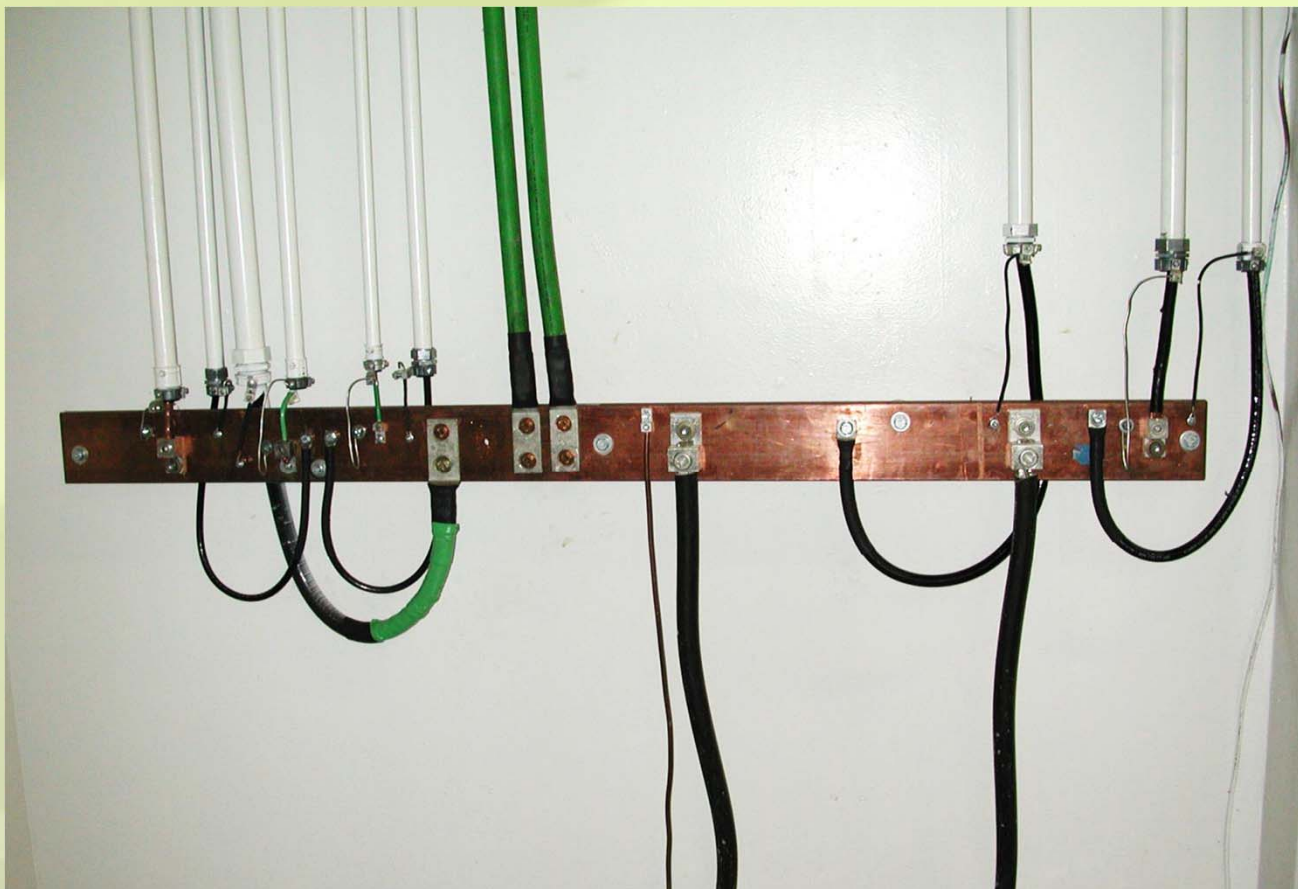
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**Lots of Excellent
Work Done Here!**



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Inductive Reactance = High Impedance



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Grounding & Protection: What Does The Telco Care About?

Grounding & Protection: What Does The Construction Contractor Care About?

Grounding & Protection: What Does The Audit/Repair Contractor Care About?



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Grounding & Protecting the Cellular Network: What is the objective?

Who are the players?

How is this accomplished today?



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Summary:

- Experience has shown that the Standards Documentation, the SOW, and Job Spec are inadequate for the Contractor to succeed.
- Customer / Owner must provide some oversight if they expect to obtain results which meets their requirements.
- Experience has shown that inadequate communication is major reason for project issues. Must be a conscientious effort with all parties involved.
- Carrier must invest more resources to manage the project, develop contractor knowledge to insure mutual success.
- Contractors must be held accountable and take ownership of their work.
- Good relationships build trust



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QUESTIONS?

Thank You!

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